Antimicrobial Resistance Among *Salmonella* Serotype Paratyphi in the United States, NARMS Data 1996-2001

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Background: *Salmonella* serotype Paratyphi infection causes a serious typhoid fever-like illness that produces sustained high fever, weakness, and stomach pain. Current treatment options include antimicrobial therapy with 3rd generation cephalosporins (eg., ceftriaxone). Humans are the only reservoir for *S.* Paratyphi. Little is known about the epidemiology and resistance patterns of *S.* Paratyphi in the United States.

Methods: In 1996, the National Antimicrobial Resistance Monitoring System (NARMS) began monitoring antimicrobial resistance among non-Typhi *Salmonella*. Public health laboratories participating in NARMS submitted every 10th non-Typhi *Salmonella* isolate to CDC for susceptibility testing. Partial range minimum inhibitory concentrations were determined for 17 antimicrobial agents using a semi-automated broth microdilution system (Sensititre®). Isolates identified as serotype *S.* Paratyphi were included in this analysis.

Results: Between 1996 and 2001, 71 *S.* Paratyphi isolates were tested by NARMS. Thirty-four (50%) cases were female. The average age of cases was 23 years (range: 1-91). Of the 71 *S.* Paratyphi isolates, 24 (33%) were serotype Paratyphi A and 47 (65%) were Paratyphi B. Of the 71 isolates, 12 (17%) were resistant to ≥1 antimicrobial agents. Two isolates (3%) were resistant to the four antimicrobial agents: each was resistant to ampicillin, chloramphenicol, sulfamethoxazole and trimethoprim-sulfamethoxazole. Eight isolates (11%) were resistant to 5 antimicrobial agents; each was resistant to ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (Resistant-Type ACSSuT). Seven ACSSuT isolates were Paratyphi B and one was Paratyphi A. Eight (11%) *S.* Paratyphi isolates showed decreased susceptibility to ciprofloxacin (MIC ≥ 0.25 μg/ml); all of these isolates were resistant to nalidixic acid. None of the S. Paratyphi isolates were resistant to ciprofloxacin or ceftriaxone.

Conclusions: Multidrug resistance was not uncommon among *Salmonella* Paratyphi but no isolates were resistant to the most commonly used antimicrobial agents or 3rd generation cephalosporins. Appropriate use of antimicrobial agents should help control the emergence and spread of resistant *S.* Paratyphi. Additional studies are needed to increase our understanding of the epidemiology of *Salmonella* Paratyphi and the development of resistance.